Introduction

The intent of this interagency monitoring handbook is to provide scientifically based training for ranchers on fundamentals of monitoring rangelands so they can develop a voluntary program to monitor the rangeland resources associated with their operation. The rancher monitoring is not intended to replace the monitoring responsibilities of the land management agencies but rather compliment agency efforts.

Monitoring is an essential tool to not only protect natural resources but also to improve the information base and ability or ranchers and agencies to justify management decisions. Monitoring means systematically recording observations of processes or activities to detect changes over time. Monitoring may serve to:

- Provide the ranchers with a systematic approach to document their stewardship effort
- Determine the effectiveness of grazing and other management practices,
- Assist in providing timely information for making livestock management decisions
- Document the effect weather and other natural changes of the resource base

Rangeland monitoring can be thought of as a "check-up" on the conditions of rangelands to assess the productivity and stability of the resource base. Land management agencies will continue to use a variety of techniques to monitor rangelands. Many New Mexico ranches already have monitoring programs established. However, it is important to know that the issues of the past may not be the issues of the future. A monitoring program needs to be flexible and current.

Rangeland monitoring can vary from a simple collection of photos to complex measurements of resource conditions. Typically, ranchers can begin with simple photographic records. As interest, experience, and knowledge grow, monitoring levels may increase to suit the rancher's situation and goals.

The monitoring techniques described in this handbook are recognized by industry representatives and agencies as technically acceptable to detect change over time. The techniques were developed by scientists from the New Mexico Range

Improvement Task Force of New Mexico State University and the Jornada Experimental Range of the Agricultural Research Service of the United States Department of Agriculture. The work of these two institutions was reviewed by the agencies of the SW Strategy and industry representatives. Southwest Strategy is a collaborative effort among Federal, State, local agencies and Tribes working to better manage the cultural and natural resources and increase community development in Arizona and New Mexico. The agencies and industry representatives mutually agreed to include both of the monitoring manuals to be used as a handbook. However, findings from self-initiated monitoring programs are not necessarily binding with regards to agency decisions.

The monitoring methods described in this handbook vary and are intended to recognize resource concerns, available time and interest in monitoring between ranchers. Each manual has its own introduction to why, what, when and where to monitor. Each manual is divided into 3 levels of monitoring techniques. Other issues such as the Endangered Species Act may require additional supplemental monitoring techniques beyond those of the Handbook. Rangeland health and conditions monitoring data found in this Handbook may not include all the data needed to resolve Threatened or Endangered Species issues, however rangeland monitoring may help the ranchers and agencies to prevent a species listing. The rancher should determine what level is best for his/her operation.

The monitoring programs shall be voluntary and the rancher has the opportunity to select among the techniques in one or both of the manuals to follow in developing a monitoring program. Data collected by the rancher under the voluntary program belongs to the rancher. Who he/she shares the data with would be their decision.

Regarding privacy of information, there are rules and laws that govern access to information that is used in agency decision-making processes. If the rancher desires to share the information with an agency but privacy of the data is a concern, the rancher should state in writing that the information is confidential and should not be disclosed by the agency. However, it should be recognized that the decision on disclosure of the information may be made through legal processes and not by the specific Agency. Where privacy of information is critical, it would be wise to seek legal advice from an attorney prior to sharing information with an agency.

Planning and design of a monitoring program

There are a number of reasons that a rancher may choose to start a monitoring program. Careful planning and design of a monitoring program increases the utility of the data and provides for an efficient program. It is important to identify, "Why am I doing this?" Prior to determining what will be monitored, where it will be monitored and when it will be monitored.

It will be helpful to include appropriate communication, consultation, cooperation and coordination with land management agencies, natural resource management agencies, agricultural advisory agencies, and local interests in developing the design of the monitoring plan that answers the why, what, where, and when questions.

Agencies and organizations that have been consulted or have cooperated on this handbook include the following:

- New Mexico Cattle Growers
- New Mexico Farm Bureau
- New Mexico Public Lands Council
- New Mexico Section of the Society for Range Management
- New Mexico Grazing Land Conservation Initiative
- New Mexico Association of Conservation Districts
- New Mexico Department of Agriculture
- New Mexico State University Range Improvement Task Force
- New Mexico State Land Office
- New Mexico State University Cooperative Extension Service
- USDA - Agricultural Research Service - Jornada Experimental Range
- USDA - Forest Service
- USDA - Natural Resources Conservation Service
- Bureau of Indian Affairs
- Bureau of Land Management
- US Fish and Wildlife Service

Revised (4/26/02) **Guidelines for selecting which methods to use, & where to find them.** ***Step 1:*** Identify objectives in the first column. ***Step 2:*** Decide whether you need quantitative data (second column). ***Step 3:*** Choose a method. Time requirements depend on monitoring objectives, plant community, precision required and experience. Time estimates for JER methods are provided on page _6_ of the Quick Start section. Time requirements are similar in most cases for objectives/methods covered in both documents.

Range (Uplands)

Objectives (document changes in . . .	Quanti-tative?	Methods[1]	Instructions (NMSU)	Instructions (JER)
Plant cover and composition	No	Photo points	Level I	Quick Start
Short-term (seasonal) grazing effects	No	Use records; visual appraisal of use & production; remarks	Level II	Quick Start
Plant and ground cover and composition	Yes	Line-point intercept or pace transect + others	(Level III)[2]	Quick Start
Site susceptibility to water runoff and water erosion	Yes	Gap intercept (basal) + stability kit[3]	--	Quick Start
Site susceptibility to wind erosion	Yes	Gap intercept (canopy)[3]	--	Quick Start
Woody species invasions	Yes	Belt transect	(Level III)[2]	Quick Start
Production	Yes	Double sampling	(Level III)[2]	Production
Plant frequency	Yes	Pace/plot	Level III	--
Compaction	Yes	Impact penetrometer	--	Chapter 15[4]
Infiltration	Yes	Single ring infiltrometer	--	Chapter 16[4]

Riparian[3]

Objectives (document changes in . . .	Quanti-tative?	Methods[1]	Methods (NMSU)	Methods (JER)
General structure	No	Photo points	Level I	Quick Start
Flow events	Yes	Measure depth and width	Level I	--
Cross section	Yes	Line-point intercept or pace transect	Level II	Quick Start
Woody species regen.	Yes	Belt transect	Level II	Quick Start
Stream margin vegetation	Yes	Greenline transect	Level II	Chapter 17[4]
Width to depth ratios	Yes	Channel profile	Level III	Chapter 18[4]
Lateral stability	Yes	Bank pins or channel profile	Level III	Chapter 18[4]
Livestock use	Yes	Woody stem tagging	Level III	--

Water Quality

See NMSU methods.

Big Game

See NMSU methods.

[1] Precipitation should always be monitored as part of any monitoring program. Place a tablespoon of oil in the raingauge to limit evaporation. There are a number of other excellent references available, including two Interagency Technical References published in 1996. For vegetation methods, see "Sampling Vegetation Attributes". For short-term (seasonal) grazing effects, see "Utilization Studies and Residual Measurements". Both should be available through your local NRCS, BLM or USFS office.

[2] Methods are listed, but not described. Additional references are listed which include methods descriptions.

[3] Listed are only the methods that are specifically designed for riparian areas. For example, most of the range (upland) methods can also be applied in riparian to provide more information on plant frequency or short-term (seasonal) grazing effects.

[4] Only the "Quick Start" section is included in the NM Rancher Monitoring Manual. For other chapters, please contact the USDA-ARS Jornada Experimental Range (khavstad@nmsu.edu or jherrick@nmsu.edu; 505-646-4842).